

GAO

United States General Accounting Office

Fact Sheet for the Chairman,
Committee on Armed Services,
House of Representatives

September 1980

**TEST AND
EVALUATION**

**DOD's Fiscal Year
1989 Test Resource
Budget**





United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

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The Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

This fact sheet is in response to your request that we determine the amount of funds budgeted by the Department of Defense (DOD) in fiscal year 1989 for test and evaluation of DOD's major weapon system acquisitions. This information is intended to give the Congress a baseline for evaluating future development and operational test resource funding requests.

Results in Brief

Test and evaluation resources included in DOD's fiscal year 1989 budget amounted to about \$5 billion. Of this amount, \$4.1 billion is allotted for the Major Range and Test Facility Base. This base consists of 21 ranges and test facilities used to support development and operational testing and training. The costs associated with this base include daily operating activities, military personnel salaries, capital investments, and charges to customers for using the ranges and test facilities.

The remaining amount, approximately \$900 million, is allotted for a mixture of Office of the Secretary of Defense and military service programs that include acquiring development and operational test resources.

Although DOD has a budgeting system for displaying actual and programmed resources, it does not aggregate all resources attributable to test and evaluation. According to DOD officials, there are limitations and constraints involved in trying to accurately identify budget figures for all related test and evaluation resources. Several program elements may provide direct, as well as indirect, support for test and evaluation. Also, some resources are difficult to segregate. For example, a special piece of test equipment may be needed to test a specific capability of a weapon system. This type of test equipment would not be included in the overall test and evaluation budget figure; neither would so-called "black" or classified programs' test and evaluation requirements be included. While training costs are included in these figures, they cannot be segregated in all cases. Consequently, test and evaluation resources

may be somewhat overstated in certain categories and understated in others.

A more detailed discussion of the results of our work is presented in appendix I.

Scope and Methodology

To obtain the most accurate and up-to-date test and evaluation resource figures for fiscal year 1989, we distinguished between Major Range Test Facility Base and all other test resources because the data were accumulated differently. For the ranges and test facilities, we reviewed budget submission exhibits and congressional conference reports. Dated September 1988, these documents represented the most current information at the time of our review.

For the remaining test and evaluation resource funding categories, we reviewed the President's budget submitted in January 1989 to obtain the most accurate figures for fiscal year 1989.

In gathering data on DOD's fiscal year 1989 budget figures for test and evaluation resources, we interviewed DOD officials responsible for test and evaluation resources and reviewed budget documentation.

We did not obtain written agency comments on this report. However, we discussed the information contained in this report with DOD representatives and incorporated their comments as appropriate.

We are sending copies of this report to the Secretaries of Defense, the Navy, Army, and Air Force and interested congressional committees and Members. We will also send copies to interested parties upon request.

Please contact me at (202) 275-8400 if you or your staff have any questions. Major contributors to this fact sheet are listed in appendix II.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Paul F. Math". The signature is stylized with a large, sweeping initial "P" and a cursive "Math".

Paul F. Math
Director, Research, Development,
Acquisition, and Procurement Issues

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Abbreviations

DOD	Department of Defense
NATO	North Atlantic Treaty Organization

DOD's Test and Evaluation Resource Budget for Fiscal Year 1989

In response to the House Committee on Armed Services' request regarding the proportion of resources allocated to development and operational testing, we developed information on DOD's test and evaluation resource budget for fiscal year 1989. The House Committee on Armed Services believes that this information could serve as a baseline for analyzing future test and evaluation funding requests.

"Test resources" is a collective term that encompasses all elements necessary to plan, collect, and analyze data from a test. Examples of test resources include manpower, test support equipment, simulation models, threat simulators, and targets.

Although DOD has a budgeting system for displaying actual and programmed resources, it does not aggregate all resources attributable to test and evaluation.

DOD Budget Procedures

The Five-Year Defense Program is the official document that summarizes DOD's programs, as approved by the Secretary of Defense. DOD uses this program to prepare its annual budget submissions to the Congress. It is also used extensively as a source of data both for analysis and for displaying and portraying actual and programmed resources.

The costs of individual programs are broken down into research and development, investment, and operating expenses. A "program element," which is a primary data element in the program, generally represents aggregations of organizational entities and related resources. Program elements are the building blocks of the budgeting system and may be analyzed in a variety of ways. For example, they can be compiled into logical groupings, such as test and evaluation resources, for analytical purposes.¹

Within the budgeting system, various types of funding are used to acquire test resources. For example, research, development, test and evaluation management, and support funding is used throughout the development and production cycle until the system is operationally deployed. Once the system is deployed, operations and maintenance

¹For this review, we obtained information on the Major Range and Test Facility Base and all other test and evaluation resources. For the Major Range and Test Facility Base, we reviewed budget submission exhibits that identified the projected funding needed to operate the ranges. For the remaining test and evaluation budget categories, we used program elements that were directly and indirectly attributable to supporting test and evaluation.

funding is used. In addition, procurement funds are normally used to acquire production items.

Limitations and Constraints

According to DOD officials, there are limitations and constraints—such as the following—involved in trying to identify all test and evaluation resource budget figures:

- DOD's budget does not aggregate all costs attributable to test and evaluation in specific budget line items. However, Office of the Secretary of Defense officials stated that it is possible to identify budgetary line items (e.g., program elements) in DOD's budget that are directly and indirectly related to these resources. That is, test and evaluation costs can be tracked at the service level via program managers. DOD officials do not believe that the identification of all test and evaluation resources is worth the additional effort in tracking.
- Program managers sometimes include unique test and evaluation resources as part of the estimated weapon systems' costs that cannot easily be identified. For example, a special piece of test equipment may be needed to test a specific capability of the weapon system. As a result, this special test equipment will not be included in overall test and evaluation budget figures.
- The budgetary line items used to designate test and evaluation resources cannot be considered "pure" because training is included as a portion of test and evaluation. For example, we identified and segregated \$636 million of training-related cost that had been included within the funding for test and evaluation resources.
- According to Navy officials, test and evaluation resources do not include those purchased for the so-called "black" or classified programs involving extremely sensitive weapon systems.

In addition to the constraints and limitations involved in isolating test and evaluation resource funding, budgetary line items used to capture test and evaluation costs can change over time, making the identification of these resources even more difficult. For example, an Office of the Secretary of Defense budgetary line item that was established for a simulator program in fiscal year 1989 was eliminated in fiscal year 1990 when simulator funding allocations were returned to the services.

Test and Evaluation Resources for Fiscal Year 1989

To provide a framework for identifying the magnitude of test and evaluation resources in DOD's fiscal year 1989 budget, we have presented data in two ways. First, test and evaluation resources are grouped into six general budget categories that include, but are not limited to, simulators and targets. Second, this same information is presented as the Office of the Secretary of Defense and the military services categorize it in their budgets.

General Test and Evaluation Budget Categories

The overall summary of test and evaluation resources for the six budget categories is provided in table I.1. Each category is then discussed separately in tables I.2 through I.6.

Table I.1: Test and Evaluation Resources for Fiscal Year 1989

Dollars in millions	
Budget category	Amount
Major Range and Test Facility Base	\$4,102 ^a
Development test and evaluation	143
Targets	207
Simulators	187
Operational test and evaluation	280
Combat development	96
Total	\$5,015

^aDue to rounding, this figure differs slightly from the sum of the Major Range and Test Facility Base subtotals included in tables I.7, I.8, I.9, and I.10.

Major Range and Test Facility Base

A primary part of DOD's test and evaluation resources is comprised of the Major Range and Test Facility Base, which consists of 21 ranges and test facilities operated for test and evaluation (both development and operational testing) as well as training. The costs to operate and maintain the ranges and test facilities include costs for institutional operations, investments, and user-reimbursable funding.

User-reimbursable funding is particularly important because it is used to capture the test and evaluation resources provided by individual weapon system programs for using the ranges and test facilities. Unique equipment acquired for a weapon systems program is not a part of the user funding. (See table I.2.)

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DOD's Test and Evaluation Resource Budget
for Fiscal Year 1989

Table I.2: Major Range and Test Facility Base Resources for Fiscal Years 1988-89

Dollars in millions		
Cost element	1988	1989
Institutional operations ^a	\$1,661	\$1,620
Military personnel salaries ^b	509	481
Research, development, test, and evaluation support ^c	50	11
Subtotal	2,220	2,112
Capital investment		
Improvement and modernization		
Research, development, test, and evaluation	169	129
Procurement	104	91
Military construction	112	194
Test instrumentation ^d	30	30
Dynamic Radar Cross Section Measurement Facility ^e	8	9
Improvement capability program ^f	49	51
Subtotal	472	504
User funding ^g	1,473	1,486
Total	\$4,165	\$4,102

^aInstitutional operations include programs and activities supporting daily operating activities. Funding for these operations is provided by each service.

^bThis figure represents the cost of military personnel assigned to the ranges and test facilities.

^cProgram element 0605863F: This program provides resources for maintaining all test and test-support-coded aircraft and support equipment items assigned to the Air Force Systems Command. These resources are included as a portion of the Major Range and Test Facility Base. Funding through this program pays for depot-level aircraft maintenance.

^dProgram element 0604940D: This program provides engineering, development, and initial acquisition of DOD-sponsored instrumentation systems that are used by two or more services to support the testing of nationally significant weapon systems. To provide additional funding for test and evaluation resources, DOD plans to add \$1.3 billion to this program element over fiscal years 1990 to 1994. This program element will be used to establish the Central Test and Evaluation Investment Program.

^eProgram element 0605809F: This program includes funds for the design, development, and installation of the Air Force Dynamic Radar Cross Section Measurement Facility that will provide needed capability for developing the Low Observable Aircraft/Missile.

^fProgram element 0604755F: This program includes the engineering, development, acquisition, and installation of significant new test range and instrumentation systems needed to ensure that the systems tested are compatible with the range used for testing.

^gUser funding, which is the reimbursement by users of the costs of the ranges and test facilities, offsets the operating cost to the service managing the range or test facility.

Development Test and Evaluation

Traditionally, this category has been used to provide support for programs that cut across service lines as well as to fund the improvement and modernization of the Major Range and Test Facility Base. This category includes joint test and evaluation programs, the development of threat simulators, and the development and demonstration of an instrumented DOD-wide Ground Positioning System. (See table I.3.)

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Table I.3: Development Test and Evaluation Resources for Fiscal Years 1988-89

Dollars in millions			
Development test and evaluation	President's budget		
	1988	1989	Change
Air Force electromagnetic radiation test facilities ^a	\$6	\$5	\$1
Army support of development testing ^b	18	19	1
Defense agencies' development test and evaluation ^c	64	55	-9
Defense agencies' live-fire testing ^d	7	9	2
Defense agencies' North Atlantic Treaty Organization Cooperation ^e	43	31	-12
Defense agencies' space system test capabilities ^f	2	2	0
Defense agencies' foreign weapons evaluation ^g	30	15	-15
Defense agencies' joint technical coordination for aircraft survival ^h	7	7	0
Total	\$177	\$143	-\$34

^aProgram element 0604747F: This program funds the operation, maintenance, and improvement of test facilities used by weapon system program offices in determining whether systems can operate in nuclear and nonnuclear electromagnetic environments.

^bProgram element 0605702A: This program develops, provides, and maintains a full range of meteorological support required by the Army at 14 permanent test sites and for special support at temporary test sites.

^cProgram element 0605804D: This program supports joint test and evaluation programs, the development of threat simulators, and several independent test and evaluation activities. This program's fiscal year 1989 budget is \$55.1 million, which includes \$12.7 million for joint live-fire testing.

^dProgram element 0605131D: Live-fire testing is performed to evaluate the vulnerability and lethality of weapon systems in combat by firing munitions likely to be encountered in combat at the weapon system's platform configured for combat. It supports the development of live-fire unique instrumentation, the procurement of necessary foreign material not otherwise available to serve as expandable live-fire testing threats and targets, and the funding of several independent test and evaluation live-fire activities.

According to DOD live-fire officials, the services have provided an additional \$29 million for the live-fire testing of various weapon systems, while other sources account for \$3.1 million, which is used to purchase foreign materials for live-fire testing. These amounts represent costs that are not specifically identified or captured by DOD's budget. Since these amounts are attributable to specific weapon systems, we have not included them in program element 0605131.

^eProgram element 0605130D: This North Atlantic Treaty Organization (NATO) Comparative Test Program supports the evaluation of NATO nations' munitions, weapons, subsystems, and equipment, with a view toward meeting a valid U.S. service requirement.

^fProgram element 0604941D: This program element funds new capabilities and the significant upgrading of existing testing capabilities and facilities required by new DOD operations in space.

^gProgram element 0605111D: This program supports the continuing test and evaluation of foreign nations' munitions, subsystems, weapons, equipment, and technologies with a view toward meeting a valid service requirement. Funds from this program element are provided directly to the services to support the test and evaluation of foreign systems and technology programs that are nominated by the services and approved by the Office of the Secretary of Defense.

^hProgram element 0605132D: This program supports the development, test, and evaluation programs and activities for joint combat survivability aircraft.

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Targets

Due to their importance to test and evaluation, targets have been singled out in the past by DOD as special interest items. Thus, targets have traditionally been categorized as unique undertakings. This budget category generally includes the development and procurement of various targets used for both test and evaluation as well as training. (See table I.4.)

Table I.4: Target Resources for Fiscal Years 1988-89

Dollars in millions

Programs	President's budget		
	1988	1989	Change
Air Force aerial targets procurement ^a	\$15	\$25	\$10
Air Force advanced aerial targets ^b	8	4	-4
Air Force target drones ^c	11	24	13
Navy advanced anti-submarine warfare targets ^d	10	11	1
Navy targets systems development ^e	70	93 ^f	23
Navy aerial targets ^g	10	17 ^f	7
Army technical test instrumentation and targets ^h	11	11	0
Army air defense targets ⁱ	20	22 ^f	2
Total	\$155	\$207	\$52

^aProgram element 0305116F: This program includes manpower authorizations, support equipment, and facilities relative to aerial targets, drone squadrons, drones, and tow targets.

^bProgram element 0604211F: The purpose of this program is to move appropriate projects that have completed advance development into engineering development. This program is intended to provide fully developed aerial target systems and subsystems based on required operational capabilities and joint service operational requirements.

^cProcurement item 3020F-#20: Funding for this program includes both full-scale and subscale aerial targets with associated augmentation, scoring, and countermeasure devices. These targets are used to test and evaluate weapon systems against simulated threat aircraft and missiles.

^dProgram element 0603529N: The Navy uses this program (projects S0968 and S1955 only) to develop underwater antisubmarine warfare mobile targets for weapon and sensor evaluation as well as fleet training.

^eProgram element 0604258N: Projects W0610 and W0611 included in this program are used to develop aerial and surface targets and associated augmentation and auxiliary systems. These projects, including W0609 and S0612, are considered necessary to duplicate or simulate threat characteristics in support of weapon systems' performance test and evaluation and fleet training.

^fThis figure includes training funds that cannot be broken out.

^gProcurement item 1507N-#27: This program provides powered and towed targets and necessary target auxiliary and augmentation systems equipment for fleet training and weapon systems test and evaluation. According to Navy officials, approximately \$16.8 million of the program's \$109.2 million funding is related to test and evaluation.

^hProgram element 0605602A: The two projects within this program that are included as test resources are D238-aerial targets and D459-ground targets. The first provides funding for development, prototype fabrication, and test and evaluation of threat-representative aerial targets. The second develops ground targets to challenge ground and air-to-ground weapons.

ⁱProcurement item C93000-#32: This program provides general purpose powered targets, towed targets, and ancillary equipment for Army air defense training worldwide and air defense weapon systems production testing, including quality assurance, lot acceptance, production qualification, and first article tests.

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Simulators

Because simulators provide the degree of realism DOD needs to test its weapon systems in an electronic warfare environment, they have also been traditionally singled out as special interest items by DOD. Threat simulators can be used for both test and evaluation as well as training. (See table I.5.)

Table I.5: Simulator Resources for Fiscal Years 1988-89

Dollars in millions

Programs	President's budget		
	1988	1989	Change
Defense agencies' joint threat simulator ^a	\$0	\$59	\$59
Air Force range improvement ^b	55	20 ^c	-35
Air Force electronic warfare development ^d	0	30	30
Navy electronic warfare simulator ^e	33	19 ^f	-14
Army user/threat simulator ^g	59	44 ^c	-15
Army special equipment procurement ^h	17	15 ^c	-2
Total	\$164	\$187	\$23

^aProgram element 0605134D: This program was created by congressional direction in a fiscal year 1989 Defense Authorization Conference Report by transferring funding from the service simulator programs. The purpose was to have the Office of the Secretary of Defense manage the threat simulator program to include the hardware development of air defense threat simulators. It is planned that the management of this program will be returned to the services by fiscal year 1990.

^bProgram element 0604735F: The Range Improvement Program is intended to improve the capability of combat forces by developing instrumentation and air defense threat simulator systems to increase the effectiveness of development and operational testing, training, and large-scale exercises.

^cThis figure includes some funds budgeted for training.

^dProgram element 0604270F: This program provides funding to the Air Force's Electronic Warfare Evaluation Simulator and Real-Time Electromagnetic Digitally Controlled Analyzer and Processor simulator efforts.

^eProgram element 0604255N: This program consolidates the design, fabrication, and integration of naval threat radar simulators for increased managerial emphasis and coordination. It also provides for the development of simulation capabilities for naval air defense, electronic warfare testing, and simulations of antiship missiles and associated threat launch platforms.

^fThis figure includes funds budgeted for other test and evaluation.

^gProgram element 0605603A: This program finances the development of instrumentation for the National Training Center and provides funds to develop threat simulators.

^hProcurement item MA6700A-#257: Funding is provided for the procurement and upgrading of actual threat weapons, threat simulators, battlefield simulators, and standard and specialized instrumentation (including data collection).

Operational Test and Evaluation

According to a DOD official, this budget category basically includes the operating cost of the operational test and evaluation agencies. (See table I.6.)

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Table I.6: Resources for Operational Test and Evaluation and Related Programs for Fiscal Years 1988-89

Programs	President's budget		
	1988	1989	Change
Air Force Operational Test and Evaluation Center ^a	\$52	\$55	\$3
Army support of operations testing ^b	49	51	2
Army aviation engineering flight activity ^c	8	8	0
Marine Corps Operational Test and Evaluation Center ^d	1	1	0
Navy's Commander Operational Test and Evaluation Force ^e	9	9	0
Navy aircraft support ^f	88	85	-3
Office of the Director, Operational Test and Evaluation ^g	11	12	1
Defense agencies' Operational Test and Evaluation Capability Improvement Program ^h	59	59	0
Total	\$277	\$280	\$3

^aProgram element 0207426F: Supported with operation and maintenance appropriations, this program provides planning, direction, control, independent evaluation, and reporting of operational test and evaluation for high visibility assigned programs.

^bProgram element 0605712A: This program finances the operational testing of weapon systems in the development phase.

^cProgram element 0605601A (project D066): Through this project, the Army conducts engineering flight testing of aircraft and aircraft systems to improve the capability of Army aviation.

^dProgram element 0605156M: This program provides support for the test planning, operational testing, and preparation of independent evaluation reports. It includes support for the operational test and evaluation tasks performed by the designated Fleet Marine Force Commanders and Technical Support Activities.

^eProgram element 0605865N: This program provides the Commander of the Operational Test and Evaluation Force with general support for the planning, conducting, and reporting of the operational test and evaluation of Navy weapons systems acquisition projects and the development and validation of tactics to enhance the tactical employment of the systems.

^fProgram element 0605863N: This program provides support for the ships, aircraft, and platforms required to accommodate the research, development, test, and evaluation of new weapon systems.

^gProgram element 0605118D: This program is the primary support for the Director of Operational Test and Evaluation, who is the principal adviser to the Secretary of Defense and Under Secretary of Defense for Acquisition on operational test and evaluation matters. This office is responsible for the direction and supervision of all aspects of operational test and evaluation (including joint test and evaluation) within DOD.

^hProgram element 0604340D: This is the core program to bring about an operational test and evaluation capability to test weapon systems in realistic air-land-sea battle scenarios. It is a focused, cohesive initiative to establish a DOD capability to conduct operational test and evaluation on conventional weapon systems in the most realistic environment that is reasonably attainable. Instrumentation, targets, and threat equipment are used in performing operational test and evaluation brought about through this program.

Combat Development

This category provides support for the experimentation, tests, projects, and evaluations necessary to develop or validate new doctrines. The budget figures were \$131 million for fiscal year 1988 and \$96 million for fiscal year 1989, according to the President's budget published in January 1990.

The Army Combat Development program element, which is program element 0208015A, is composed of the Army Operational Test and Evaluation Agency, the Combat Development Experimentation Command; the Training and Doctrine Command's Combined Arms Test Activity; miscellaneous combat development experiment tests, projects, and evaluations; and the Concepts Analysis Agency.

While this section placed the DOD test and evaluation resources within six budget categories, the following section sets out those same test and evaluation resources according to organizations—the Office of the Secretary of Defense and the services.

DOD's Test and Evaluation Resources

Although the services are primarily responsible for acquiring test resources, DOD has initiated programs that are multiservice in nature. During fiscal year 1989, the Office of the Secretary of Defense's organizations budgeted \$0.3 million for test and evaluation resources, while the Army budgeted about \$1.2 billion, the Navy budgeted \$1.3 billion, and the Air Force budgeted \$2.2 billion.²

The Office of the Secretary of Defense's Test and Evaluation Resources

The Office of the Secretary of Defense's organizations provided \$0.3 million for test and evaluation resources for fiscal year 1989. In some categories, the budgets are used to support Office of Secretary of Defense organizations having oversight responsibility for development and operational testing. The Office of the Secretary of Defense has also initiated programs that are applicable to more than one service. (See table I.7.)

²When these figures are added, the total figure differs slightly from the aggregate figure reported in table I.1 due to rounding.

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Table I.7: Office of the Secretary of Defense Test and Evaluation Resources for Fiscal Year 1989

Dollars in millions	
Major Range and Test Facility Base	Amount
Capital Investment - Test instrumentation ^a	\$30
Total	30
Program element	
Development test and evaluation related	
Development test and evaluation ^b	55
NATO comparative test ^b	31
Space systems test capability ^b	2
Foreign weapon system evaluation ^b	15
Live-fire testing ^b	9
Joint technical coordination for aircraft survivability ^b	7
Subtotal	119
Threat simulator related	
Joint threat simulator ^c	59
Subtotal	59
Operational test and evaluation	
Operational Test and Evaluation Capability Improvement Program ^d	59
Office of the Director, Operational Test and Evaluation ^d	12
Subtotal	71
Subtotal	249
Total	\$279

^aSee table I.2 for a description of program element 0604940D.

^bSee table I.3 for descriptions of program elements 065804D, 0605130D, 0604941D, 0605111D, 0605131D, and 0605132D.

^cSee table I.5 for a description of program element 0605134D.

^dSee table I.6 for a description of program elements 0604340D and 0605118D.

Army Test and Evaluation Resources

The Army had a budget of about \$1.2 billion for test and evaluation resources for fiscal year 1989. This consisted of \$981 million for the Major Range and Test Facility Base and \$266 million in other funded category items. Since it is difficult to separate training resources from test and evaluation resources, these figures also include the cost of training. (See table I.8.)

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Table I.8: Army Test and Evaluation Resources for Fiscal Year 1989

Dollars in millions	
Major Range and Test Facility Base	Amount
Yuma Proving Ground ^a	\$88
Aberdeen Proving Ground ^b	216
Dugway Proving Ground ^c	78
White Sands Missile Range ^d	253
Electronics Proving Ground ^e	66
High-Energy Laser Test Facility ^f	37
Kwajalein Missile Range ^g	243
Total	981
Program elements/procurement item	
Development test and evaluation related	
Support of development testing ^h	19
Subtotal	19
Combat development	
Combat development ⁱ	96
Subtotal	96
Target related	
Technical test instrumentation and targets (projects D238 and 459 only) ^j	11
Air defense targets ^l	22
Subtotal	33
Threat simulator related	
Army user/threat simulators ^k	44
Special equipment for user testing ^k	15
Subtotal	59
Operational test and evaluation	
Support of operations testing ^l	51
Army aviation engineering activity (project D066) ^l	8
Subtotal	59
Subtotal	266
Total	\$1,247

^aThis proving ground is in the southwestern part of Arizona. It supports not only the testing of long-range tube artillery, aircraft armament and air delivery systems and equipment, and air movable equipment, but also natural desert environmental phases of developmental testing of all classes of defense material for DOD and other government agencies.

(cont.)

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^dThis proving ground is located 30 miles northeast of Baltimore, Maryland. It is used to conduct development and other tests on artillery weapon systems, ammunition, mortars, recoilless rifles, armored vehicles, grenades, mines, and pyrotechnics.

^eThis proving ground is located 87 miles southwest of Salt Lake City, Utah. It is involved in testing conventional munitions and air vehicles and a variety of other test support activities. It also has unique capabilities for testing chemical warfare, biological defensive systems, and protective items.

^fThis test facility, which is located 50 miles north of El Paso, Texas, and 25 miles northeast of Las Cruces, New Mexico, has extended range launch complexes located in southeast Utah and southwest Idaho. It is used to plan and conduct the development testing and evaluation of Army missiles, rockets, and material systems. This range also controls and monitors all electromagnetic radiation devices on and adjacent to the range and conducts research and development of range instrumentation.

^gThis facility is located at Fort Huachuca, 70 miles southeast of Tucson, Arizona. Its mission includes the testing of all types of Army ground and airborne communications electronics as well as electronic surveillance and detection systems.

^hThis facility was constructed in the southern portion of the main area of the White Sands Missile Range. It has the capability to test the new directed energy devices.

⁹This missile range is located in the Pacific Ocean at the Kwajalein Atoll. Its mission is to support on-site ballistic missile defense research and development programs, strategic offensive weapon system developmental and operational testing, and data collection for the DOD intelligence community.

^hSee table I.3 for a description of program element 0605702A.

ⁱSee p. 17 for a description of program element 0208015A.

^jSee table I.4 for descriptions of program element 0605602A and procurement item C9300.

^kSee table I.5 for descriptions of program element 0605603A and procurement item MA6700.

^lSee table I.6 for description of program elements 0605712A and 0605601A.

**Navy Test and Evaluation
Resources**

The Navy provided \$1.3 billion for test and evaluation for fiscal year 1989: \$1 billion for the Major Range and Test Facility Base and \$235 million for other funded category items. Since it is difficult to separate training resources from test and evaluation resources, these figures also include the cost of training. (See table I.9.)

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Table I.9: Navy Test and Evaluation Resources for Fiscal Year 1989

Dollars in millions	
Major Range and Test Facility Base	Amount
Atlantic Undersea Test and Evaluation Center ^a	\$79
Naval Air Propulsion Center ^b	72
Naval Air Test Center ^c	445
Naval Weapons Center ^d	203
Pacific Missile Test Center ^e	227
Other range support	
Navy - antisubmarine warfare range support ^f	23
Total	1,049
Program elements/procurement items	
Target related	
Advance antisubmarine warfare targets (projects S0968 and S1955) ^g	11
Target system development ^g	93
Navy aerial targets ^g	17
Subtotal	121
Threat simulators	
Electronic warfare simulator development ^h	19
Subtotal	19
Operational test and evaluation	
Navy operational test and evaluation ⁱ	9
Marine Corps operational test and evaluation ⁱ	1
Navy ship/aircraft support ⁱ	85
Subtotal	95
Subtotal	235
Total	\$1,284

^aThis facility is a detachment of the Naval Underwater Systems Center at Newport, Rhode Island. It is located on Andros Island, Bahamas, with the ranges located in the Tongue of the Ocean, a sheltered, deep, quiet body of water. It provides, develops, and operates the deep water facility for underwater acoustic measurements and testing and calibrating sonars. It also provides tracking data on ships, submarines, aircraft, and weapon systems. This effort supports the Navy antisubmarine warfare and undersea research and development programs, assessment, and operational readiness.

^bThis center is located in Trenton, New Jersey. It provides complete technical and engineering support for air-breathing propulsion systems. This includes providing accessories, components, fuels, and lubricants. The center also manages and performs applied research, development, test, and evaluation for the Naval Air Systems Command and the fleet.

^cThis center is in Lexington Park, Maryland. Its mission is to provide technical and engineering support, facilities for life-cycle test and evaluation, and support for aircraft weapon systems and components.

^dLocated at China Lake, California, this center conducts test and evaluation of air- and surface-launched weapons, electronic warfare systems, missiles, life-support systems, and parachute systems.

(cont.)

**Appendix I
DOD's Test and Evaluation Resource Budget
for Fiscal Year 1989**

^eThis center's mission includes development, test, evaluation, and follow-on engineering, logistics, and training support for naval weapons, weapon systems, and related devices. It also provides major range, technical, and base support for Navy research, development, test, and evaluation users, the fleet, and other DOD and government agencies.

^fThe Antisubmarine Warfare Range Support Program provides training range, weapon proofing range equipment, and fleet support equipment for use on the Navy's underwater ranges.

^gSee table I.4 for descriptions of program elements 0603529N and 0604258N and procurement item 1507N-#27.

^hSee table I.5 for a description of program element 0604255N.

ⁱSee table I.6 for descriptions of program elements 0605865N, 0605156M, and 0605863N.

**Air Force Test and Evaluation
Resources**

The Air Force had a test and evaluation resource budget of approximately \$2.2 billion for fiscal year 1989. This amount consisted of \$2 billion for Major Range and Test Facility Base and \$163 million for other funded category items. Since it is difficult to completely separate training resources from test and evaluation resources, these figures may also include some training costs. (See table I.10.)

Appendix I
DOD's Test and Evaluation Resource Budget
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Table I.10: Air Force Test and Evaluation Resources for Fiscal Year 1989

Dollars in millions	
Major Range and Test Facility Base	Amount
4950 Test Wing - Wright Patterson Air Force Base ^a	\$158
6585 Test Wing - Holloman Air Force Base ^b	61
3246 Test Wing - Eglin Air Force Base ^c	396
Arnold Engineering Development Center ^d	378
Air Force Flight Test Center ^e	418
Eastern Space and Missile Center ^f	329
Western Space and Missile Center ^g	201
Tactical Fighter Weapons Center ^{h,i}	64
Utah Test and Training Range ^{j,l}	39
Total	2,044
Program elements/procurement items	
Development test and evaluation related	
Electronic radiation test facilities ^k	5
Subtotal	5
Targets	
Aerial target procurement ^l	25
Advance aerial targets ^l	4
Target drones ^l	24
Subtotal	53
Threat simulators	
Range Improvement ^m	20
Electronic warfare (project 1627) ^m	30
Subtotal	50
Operational test and evaluation	
Air Force Operational Test and Evaluation Center ⁿ	55
Subtotal	55
Subtotal	163
Total	\$2,207

^aThis test wing's mission includes, but is not limited to, flight testing military systems, subsystems, and components, and operating and maintaining a fleet of test support aircraft.

^bThis group provides test and evaluation of aerospace navigation and guidance systems and components, simulation of dynamic flight conditions, as well as operates and supports Air Force Systems Command test aircraft. It is the sponsor for Air Force users of the White Sands Missile Range

^cThe land range area is located in northwest Florida, while the water test ranges cover most of the Gulf of Mexico. This test wing provides the development test and evaluation of nonnuclear air armament for the Air Force. It also provides support for operational training, operational test and evaluation of armament and electronic combat systems, and other activities conducted by operational commands.

(cont.)

Appendix I
DOD's Test and Evaluation Resource Budget
for Fiscal Year 1989

^dThis center manages, develops, and operates ground environmental test facilities in support of the research and development of aerospace systems. According to Air Force test and evaluation staff, the facility also includes large wind tunnels, space chambers, ballistic ranges, engine test cells, and rocket motor test facilities.

^eA few of this center's mission elements are to plan, accomplish, and report on Air Force development test and evaluation of manned and unmanned aircraft systems and participate in Air Force Initial Operational Test and Evaluation and follow-on tests of manned aircraft systems.

^fThis center's mission includes the management and operation of the Eastern Test Range, which supports the launching and testing of missile and space systems from Cape Canaveral, and the support of the Space Transportation System, which is launched from the Kennedy Space Center.

^gThis center manages and operates the Western Test Range and space and missile field test operations and supports guided missile and aeronautical testing.

^hThis center provides an operational, combat-like range facility where multiple air and ground participants can accomplish integrated air-to-air and air-to-ground training and test and evaluation missions.

ⁱThis center and range are considered by the Air Force test and evaluation staff to be primarily used for training versus test and evaluation.

^jThis range provides facilities for all phases of the test and evaluation of manned and unmanned aircraft systems and tactical training for air-to-air and air-to-ground weapon delivery. The range management is the responsibility of the 6501st Range Squadron, which reports to the 6545th Test Group and the Air Force Flight Test Center. According to Air Force test and evaluation staff, the range will become the host of the Electronic Combat Test Capability, which is primarily an operational test and evaluation requirement.

^kSee table I.3 for a description of program element 0604747F.

^lSee table I.4 for descriptions of program elements 0305116F and 0604211F and procurement item 3020F-#20.

^mSee table I.5 for descriptions of program elements 0604735F and 0604270F.

ⁿSee table I.6 for a description of program element 0207426F.

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